

Middle Middle Miocene Fan 1 Play

MM7 F1, #1681

Cibicides opima through *Bigenerina humblei*

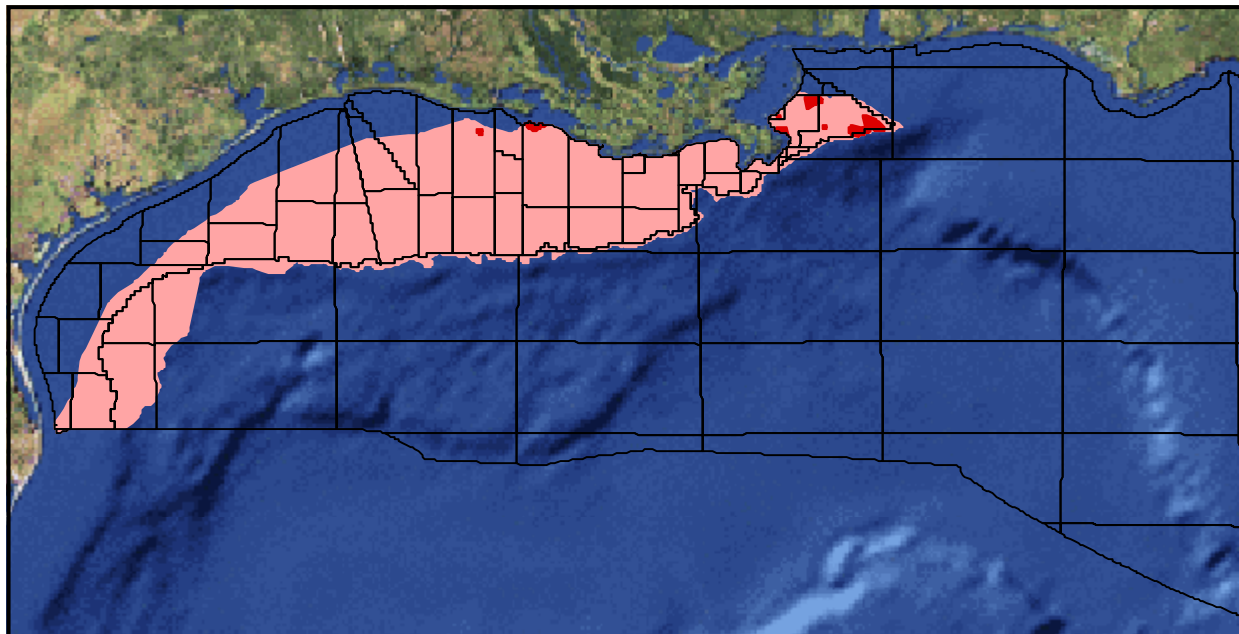


Figure 288. MM7 F1 map showing location of play. Play limit shown in light red; hydrocarbon limit shown in dark red.

Overview

The Middle Middle Miocene Fan 1 Play (MM7 F1) contains reserves of 502.698 Bcfg and 26.532 MMbo (115.980 MMBOE) in 33 sands in 17 fields. The play extends continuously from the South Padre Island to Destin Dome Areas ([Figure 288](#)).

Description

MM7 F1 is defined by (1) a deep-sea fan depositional style representing sediments deposited basinward of the shelf edges associated with the MM7 Chronozone, (2) an extensional structural regime with salt-withdrawal basins and extensive listric, growth faulting rooting into salt detachments on the modern GOM shelf, and (3) the MM-5, MM-6, and MM-7 Chronozones, the tops of which are defined by the *Cibicides opima*, *Cristellaria* "I", and *Bigenerina humblei* biozones, respectively ([Figure 8](#)).

MM7 F1 extends continuously from the South Padre Island Area offshore Texas, along and updip from the modern GOM shelf edge to the west-central Destin Dome Area east of the modern Mississippi River Delta ([Figure 288](#)). Hydrocarbons have

been discovered in a very limited area of the play that includes the Vermilion, Eugene Island, Main Pass, and Viosca Knoll Areas.

Instead of two separate delta systems supplying sediment to the offshore Texas area like in lower middle Miocene (MM4) time, a single large delta system, the South Brazos, became the dominant supplier of sediment in MM7 time, as the North Padre Delta System shifted much farther inland with the widespread MM4, *Amphistegina* "B" flooding event (Morton et al., 1985). The South Brazos Delta occupied what had previously been an interdeltaic embayment (Morton et al., 1985). The ancestral Mississippi River Delta System supplied sediment to the Louisiana offshore in MM7 time. Only those sands deposited by the ancestral Mississippi Delta System are productive in the play.

Even though a major change in delta systems took place offshore Texas from MM4 to MM7 time, no significant lateral shift occurs from MM4 deep-sea fan deposits to those of MM7 time. However, the shelf edge west of the Eugene Island Area shows a significant basinward shift from MM4 to MM7 time, indicative of the prograding nature of the ancient delta systems.

Play Limits

MM7 F1 extends onshore in an updip direction, except from the South Padre Island to Eugene Island Area. Here, the play is limited by the MM-5 shelf edge, the farthest updip shelf edge associated with the MM7 Chronozone, and grades into the sediments of the Middle Middle Miocene Progradational Play (MM7 P1). To the northeast, MM7 F1 is limited by the deposits of the Middle Middle Miocene Aggradational/Progradational Play (MM7 AP1) overlying the lower Cretaceous carbonate shelf. (The deposits of MM7 AP1 are extremely thin, sand poor, and unproductive and are, therefore, not presented as a formal play in the study.) To the southwest, the play extends into Mexican national waters. Downdip, MM7 F1 is limited by the Middle Middle Miocene Fan 2 Play (MM7 F2).

Depositional Style

MM7 F1 is characterized by deep-sea fan systems deposited basinward of the MM-5 shelf edge. Component facies include channel/levee complexes, sheet-sand lobes, interlobe/fringe sediments, and slump sediments that were deposited on the MM-5 through MM-7 upper and lower slopes, in topographically low areas between salt structure highs, and abyssal plains. These deep-sea fan systems are often overlain by thick shale intervals representative of zones of sand bypass on the shelf, or sand-poor zones on the slope.

The MM7 deep-sea fan interval varies from approximately 300 to more than 4,200 ft in thickness, with net sand thicknesses as much as approximately 600 ft. Thick, upward-coarsening and upward-fining log patterns of sand-dominated intervals represent sheet-sand lobe progradation and channel fill/abandonment, respectively, in proximal-fan areas. Irregularly stratified sand successions displaying spiky log patterns suggest deposition in distal-fan areas.

Structural Style

Anticlines, normal faults, and hydrocarbon accumulations trapped by permeability barriers and updip pinchouts or facies changes are the most common MM7 F1 structural styles. Less commonly, salt diapirs—shallow and deep depths—with hydrocarbons trapped on diapir flanks or in sediments draped over diapir tops occur.

Quantitative Attributes

On the basis of reserves calculations, MM7 F1 contains 77% gas and 23% oil. The 33 sands in the play comprise 42 reservoirs, of which 38 are nonassociated gas and 4 are undersaturated oil. Proved reserves are estimated at 443.662 Bcfg and 16.258 MMbo (95.194 MMBOE) in 29 sands in 14 fields ([Table 137](#)). Unproved reserves are estimated at 59.075 Bcfg and 10.274 MMbo (20.786 MMBOE) in 4 sands in 3 fields. These proved plus unproved reserves account for only 4% of the reserves for the MM7 Chronozone.

	No. of Sands	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)
Proved	29	16.258	443.622	95.194
Cum. production	20	10.205	302.913	64.104
Remaining proved	17	6.053	140.709	31.090
Unproved	4	10.274	59.075	20.786

Table 137. MM7 F1 reserves and cumulative production.

Cumulative production from MM7 F1 totals 302.913 Bcfg and 10.205 MMbo (64.104 MMBOE) from 20 sands in 12 fields. This production accounts for only 3% of the MM7 Chronozone's total production. Remaining proved reserves in the play are 140.709 Bcfg and 6.053 MMbo (31.090 MMBOE) in 17 sands in 9 fields.

[Table 138](#) illustrates that water depths of the fields in MM7 F1 range from 13-399 ft, and play interval discovery depths vary from 9,480-16,341 ft, subsea. Additionally, porosity and water saturation range from 20-31% and 16-68%, respectively.

33 Sands	Min	Mean	Max
Water depth (ft)	13	202	399
Subsea depth (ft)	9,480	12,709	16,341
Reservoirs per sand	1	1	4
Porosity	20%	24%	31%
Water saturation	16%	33%	68%

Table 138. MM7 F1 sand attributes. Values are volume-weighted averages of individual reservoir attributes.

Exploration History

MM7 F1 has a 19-year history of discoveries ([Figure 289](#)). The first sands in the play were discovered in 1980 in the Eugene Island 24 and Main Pass 73 Fields. This includes the largest sand in the play found in the Eugene Island 24 Field. This sand is estimated to contain 27.718 MMBOE ([Figure 290](#)). The maximum number of sands dis-

covered in any year occurred in 1997 with seven sands from three fields ([Figure 289](#)). However, the maximum yearly reserves of 42.423 MMBOE were added in 1995 with the discovery of five sands in three fields. The potential for future discoveries is excellent as evidenced by the peak discovery years of 1997 and 1998. In fact, since the first Atlas database cutoff of January 1, 1995, about two-thirds of the play's sands have been discovered, the largest of which is estimated to contain 14.193 MMBOE. The mean sand size for the play is 3.515 MMBOE.

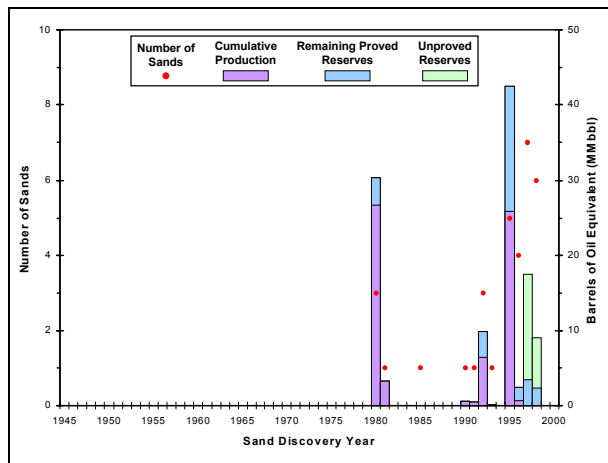


Figure 289. MM7 F1 exploration history graph showing reserves and number of sands discovered by year.

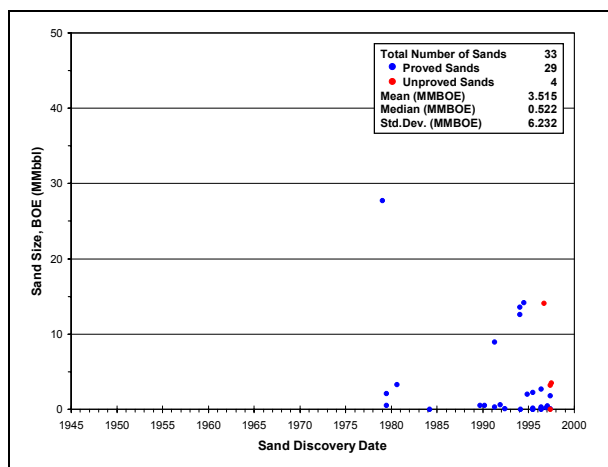


Figure 290. MM7 F1 sand discovery graph showing the size of sands discovered by year.

Production History

MM7 F1 has a 16-year history of production ([Figure 291](#)). Production began in 1983, and reached a low in 1992. Since then, gas production has generally increased. In comparison, oil production showed a slight decline in 1998 from the 1997 peak level.

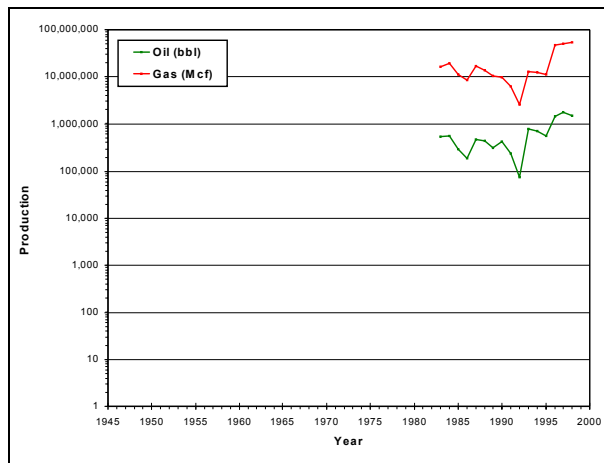


Figure 291. MM7 F1 production graph showing oil and gas production by year.